

Date: Monday, 10/23/2006 12:05:18 PM
 User: Kim Johnston

Process Sheet

Customer : CU-DAR001 Dart Helicopters Services
 Job Number : 29108
 Estimate Number : 11057
 P.O. Number : N/A
 This Issue : 10/23/2006 S.O. No. : N/A
 Prsht Rev. : NC
 First Issue : N/A Type : PURCHASED PARTS
 Previous Run : 29086
 Written By : *[Signature]*
 Checked & Approved By : *[Signature]* 06 10 23
 Comment : Est. C 02/11/26 Added P/O KJ

Drawing Name : 02.250 SUPPORT
 Part Number : D28911
 Drawing Number : D2891 REV A1
 Project Number : N/A
 Drawing Revision : A1
 Material : N/A
 Due Date : 11/10/2006

Qty: 20 Um: Each

Additional Product

Job Number:



Seq. #: Machine Or Operation: Description :

1.0 PG PURCHASING



Comment: PURCHASING

Issue P/O: 2316

C 06/10/24

(20)

Description: D6104-003

Material: 17-4 PH SS (AMS 5643 OR AISI 630) as per Dwg D6104

Material release note required.

Blank size makes (2) D2891-1

2.0 D6104003 17-4 SS Roundbar 3.25"OD



Comment: Qty.: 1.0000 Each(s)/Unit Total: 20.0000 Each(s)
 Support 2.25 dia

3.0 PACKAGING 1 PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1

Recieve & Inspect for Transit Damage

Ensure Material Release Note is attached

L Box 11/10/01 (20)

4.0 MORI SEIKI MORI SEIKI CNC LATHE LARGE



Comment: MORI SEIKI LATHE

Turn blank for Haas as per Folio FA046

20 / 11/11/03 20

5.0 QC1 INSPECT ALL DIM TO DIM SHEET



Comment: INSPECT ALL DIM TO DIM SHEET

20 / 11/11/03 20

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes ☒ No ☐ DQA: ☒ ☐ Date: 07/01/08

QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Date: Monday, 10/23/2006 12:05:19 PM
User: Kim Johnston

Process Sheet

Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: 02.250 SUPPORT

Job Number: 29108

Part Number: D28911

Job Number:



Seq. #:	Machine Or Operation:	Description :
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6.0

HAAS1

HAAS CNC VERTICAL MACHINING #1



Comment: HAAS

Machine as per Folio FA046
Tumble & Deburr

CP/3.6 06/12/02 40

7.0

QC2

INSPECT PARTS AS THEY COME OFF MACHINE



Comment: INSPECT PARTS AS THEY COME OFF MACHINE

CP/3.6 06/12/02 40

8.0

QC8

SECOND CHECK



Comment: SECOND CHECK

SD 06/12/04 40

9.0

POWDER COATING

POWDER COATING



Comment: POWDER COATING

Powder Coat White Gloss (Ref: 4.3.5.2) as per QSI 005 4.3

FC 07/01/04 40

10.0

QC3

INSPECT POWDER COAT/CHEMICAL CONVERSION



Comment: INSPECT POWDER COAT/CHEMICAL CONVERSION

PU 7/01/04 40

11.0

PACKAGING 1

PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1

Identify and Stock

Location: 51375

07/01/04 40 PO 7/01/04

12.0

QC21

FINAL INSPECTION/W/O RELEASE



Comment: FINAL INSPECTION/W/O RELEASE

07-01-05

Job Completion



CI07/01/05

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____
 QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

DART AEROSPACE LTD	Work Order: 29108
Description: Ø2.250 Support	Part Number: D2891-1
Inspection Dwg: D2891 Rev. A1	Page 1 of 1

Inspect dimensions highlighted on inspection sheet drawing D2891 Rev.A1/DSK076 Rev.A and record below:

				Recorded Actual Dimensions					
Dim	Min	Max	Go/No Go Gauge	1	2	3	4	By	Date
Lathe Section									
A	2.274	2.279		2.279	2.279	2.279	2.279	BC	06.11.05
B	3.702	3.722		3.712	3.710	3.712	3.715		
C	2.564	2.584		2.574	2.574	2.576	2.576		
D	0.718	0.738		.728	.728	.728	.728		
E	0.090	0.110		.100	.100	.100	.100		
F	2.464	2.484		2.472	2.474	2.476	2.476		
G	2.029	2.049		2.03	2.039	2.039	2.039		
H	2.964	2.984		2.970	2.971	2.971	2.971		
I	0.913	0.933		.923	.923	.923	.923		
J	0.022	0.042		.032	.032	.032	.032		
K	0.090	0.110		.097	.097	.100	.100		
L									
HAAS Section									
AA	0.188	0.193	DT8708	0.189	0.189	0.189	0.185		
AB	0.240	0.260		0.251	0.249	0.244	0.254		
AC	0.115	0.150		0.122	0.125	0.128	0.123		
AD	0.040	0.060		0.046	0.042	0.051	0.053		
AE	0.010	0.020		0.015	0.015	0.015	0.015		
AF	0.240	0.260		0.250	0.250	0.250	0.250		
AG	0.290	0.310		0.296	0.296	0.301	0.298		
AH	0.115	0.150		0.134	0.136	0.136	0.137		
AI	0.454	0.474		0.465	0.457	0.462	0.460		
AJ	2.779	2.789		2.784	2.784	2.784	2.784		
AK	0.240	0.260		0.250	0.250	0.250	0.250		
AL	1.002	1.042		1.042	1.047	1.047	1.047		
AM	0.053	0.073		0.063	0.063	0.063	0.063		
AN	0.257	0.262	DT8683	0.260	0.266	0.266	0.266		
AO	1.663	1.683		1.678	1.677	1.677	1.678		
AP	0.053	0.073		0.063	0.063	0.063	0.063		
AQ	0.022	0.042		0.032	0.032	0.032	0.032		
AR									
AS									
Accept/Reject									

Measured by: MS1	/EP
Date: 06.11.03	06.12.01

Audited by: SA
Date: 06.12.04

Rev	Date	Change	Revised by	Approved
A	02.12.12	New Issue	KJ/RF	#

DART AEROSPACE LTD	Work Order: 29108
Description: Ø2.250 Support	Part Number: D2891-1
Inspection Dwg: D2891 Rev. A1	Page 1 of 1

Inspect dimensions highlighted on inspection sheet drawing D2891 Rev.A1/DSK076 Rev.A and record below:

				Recorded Actual Dimensions					
Dim	Min	Max	Go/No Go Gauge	Ø5	Ø6	Ø7	Ø8	By	Date
Lathe Section									
A	2.274	2.279		2.279	2.279	2.279	2.279	36	06.11.05
B	3.702	3.722		3.712	3.712	3.712	3.712		
C	2.564	2.584		2.573	2.573	2.573	2.573		
D	0.718	0.738		.725	.725	.725	.725		
E	0.090	0.110		.100	.100	.100	.100		
F	2.464	2.484		2.473	2.473	2.473	2.473		
G	2.029	2.049		2.039	2.039	2.039	2.039		
H	2.964	2.984		2.973	2.973	2.973	2.973		
I	0.913	0.933		.923	.923	.923	.923		
J	0.022	0.042		.032	.032	.032	.032		
K	0.090	0.110		.097	.097	.097	.097		
L									
HAAS Section									
AA	0.188	0.193	DT0706	0.189	0.189	0.189	0.189		
AB	0.240	0.260		0.254	0.254	0.254	0.254		
AC	0.115	0.150		0.126	0.124	0.123	0.124		
AD	0.040	0.060		0.051	0.050	0.051	0.050		
AE	0.010	0.020		0.015	0.015	0.015	0.015		
AF	0.240	0.260		0.250	0.250	0.250	0.250		
AG	0.290	0.310		0.298	0.300	0.294	0.300		
AH	0.115	0.150		0.143	0.140	0.141	0.141		
AI	0.454	0.474		0.462	0.464	0.464	0.464		
AJ	2.779	2.789		2.784	2.784	2.784	2.784		
AK	0.240	0.260		0.250	0.250	0.250	0.250		
AL	1.002	1.042		1.042	1.042	1.042	1.042		
AM	0.053	0.073		0.063	0.063	0.063	0.063		
AN	0.257	0.262	DT0683	0.260	0.260	0.260	0.260		
AO	1.663	1.683		1.680	1.681	1.682	1.681		
AP	0.053	0.073		0.063	0.063	0.063	0.063		
AQ	0.022	0.042		0.032	0.032	0.032	0.032		
AR									
AS									
Accept/Reject									

Measured by: 36/EP/3.6
Date: 06.12.04

Audited by: SD
Date: 06.12.04

Rev	Date	Change	Revised by	Approved
A	02.12.12	New Issue	KJ/RF	✱

DART AEROSPACE LTD	Work Order: 29108
Description: Ø2.250 Support	Part Number: D2891-1
Inspection Dwg: D2891 Rev. A1	Page 1 of 1

Inspect dimensions highlighted on inspection sheet drawing D2891 Rev.A1/DSK076 Rev.A and record below:

				Recorded Actual Dimensions					
Dim	Min	Max	Go/No Go Gauge	#9	#10	#11	#12	By	Date
Lathe Section									
A	2.274	2.279	2.279 →	2.279	2.279	2.279	2.279	BC	06.11.05
B	3.702	3.722	3.712 →	3.712	3.712	3.712	3.712		
C	2.564	2.584	2.573 →	2.573	2.573	2.573	2.573		
D	0.718	0.738	.725 →	.725	.725	.725	.725		
E	0.090	0.110	.100 →	.100	.100	.100	.100		
F	2.464	2.484	2.473 →	2.473	2.473	2.473	2.473		
G	2.029	2.049	2.039 →	2.039	2.039	2.039	2.039		
H	2.964	2.984	2.973 →	2.973	2.973	2.973	2.973		
I	0.913	0.933	.923 →	.923	.923	.923	.923		
J	0.022	0.042	.032 →	.032	.032	.032	.032		
K	0.090	0.110	.097 →	.097	.097	.097	.097		
L									
HAAS Section									
AA	0.188	0.193	DT8706	0.190	0.190	0.190	0.190		
AB	0.240	0.260		0.254	0.254	0.254	0.254		
AC	0.115	0.150		0.126	0.127	0.126	0.126		
AD	0.040	0.060		0.051	0.050	0.052	0.051		
AE	0.010	0.020		0.013	0.015	0.015	0.015		
AF	0.240	0.260		0.250	0.250	0.250	0.250		
AG	0.290	0.310		0.300	0.299	0.300	0.300		
AH	0.115	0.150		0.141	0.140	0.141	0.141		
AI	0.454	0.474		0.464	0.464	0.463	0.461		
AJ	2.779	2.789		2.784	2.784	2.784	2.783		
AK	0.240	0.260		0.250	0.250	0.250	0.250		
AL	1.002	1.042		1.042	1.041	1.042	1.041		
AM	0.053	0.073		0.063	0.063	0.063	0.063		
AN	0.257	0.262	DT8683	0.258	0.258	0.258	0.258		
AO	1.663	1.683		1.681	1.682	1.681	1.682		
AP	0.053	0.073		0.063	0.063	0.063	0.063		
AQ	0.022	0.042		0.032	0.032	0.032	0.032		
AR									
AS									
Accept/Reject									

Measured by:	BC / J.G
Date:	06/12/05

Audited by:	SA
Date:	06.12.05

Rev	Date	Change	Revised by	Approved
A	02.12.12	New Issue	KJ/RF	

DART AEROSPACE LTD	Work Order:	29108
Description: Ø2.250 Support	Part Number:	D2891-1
Inspection Dwg: D2891 Rev. A1		Page 1 of 1

Inspect dimensions highlighted on inspection sheet drawing D2891 Rev.A1/DSK076 Rev.A and record below:

				Recorded Actual Dimensions					
Dim	Min	Max	Go/No Go Gauge	13	14	15	16	By	Date
Lathe Section									
A	2.274	2.279		2.279	2.279	2.279	2.279	BC	06.11.05
B	3.702	3.722		3.712	3.712	3.712	3.712		
C	2.564	2.584		2.573	2.573	2.573	2.573		
D	0.718	0.738		.725	.725	.725	.725		
E	0.090	0.110		.100	.100	.100	.100		
F	2.464	2.484		2.473	2.473	2.473	2.473		
G	2.029	2.049		2.039	2.039	2.039	2.039		
H	2.964	2.984		2.973	2.973	2.973	2.973		
I	0.913	0.933		.923	.923	.923	.923		
J	0.022	0.042		.032	.032	.032	.032		
K	0.090	0.110		.097	.097	.097	.097		
L									
HAAS Section									
AA	0.188	0.193	DT8706	0.190	0.190	0.190	0.190		
AB	0.240	0.260		0.251	0.250	0.251	0.250		
AC	0.115	0.150		0.126	0.126	0.127	0.126		
AD	0.040	0.060		0.051	0.052	0.051	0.051		
AE	0.010	0.020		0.015	0.015	0.015	0.015		
AF	0.240	0.260		0.250	0.250	0.250	0.250		
AG	0.290	0.310		0.300	0.300	0.300	0.299		
AH	0.115	0.150		0.145	0.144	0.141	0.141		
AI	0.454	0.474		0.464	0.464	0.463	0.462		
AJ	2.779	2.789		2.784	2.784	2.783	2.783		
AK	0.240	0.260		0.250	0.250	0.250	0.250		
AL	1.002	1.042		1.042	1.042	1.042	1.042		
AM	0.053	0.073		0.063	0.063	0.063	0.063		
AN	0.257	0.262	DT8683	0.258	0.258	0.258	0.258		
AO	1.663	1.683		1.681	1.680	1.682	1.682		
AP	0.053	0.073		0.063	0.063	0.063	0.063		
AQ	0.022	0.042		0.032	0.032	0.032	0.032		
AR									
AS									
Accept/Reject									

Measured by:	BA / J.G
Date:	06/12/03

Audited by:	SA
Date:	06.12.04

Rev	Date	Change	Revised by	Approved
A	02.12.12	New Issue	KJ/RF	J

DART AEROSPACE LTD	Work Order:	29108
Description: Ø2.250 Support	Part Number:	D2891-1
Inspection Dwg: D2891 Rev. A1		Page 1 of 1

Inspect dimensions highlighted on inspection sheet drawing D2891 Rev.A1/DSK076 Rev.A and record below:

				Recorded Actual Dimensions					
Dim	Min	Max	Go/No Go Gauge	17	18	19	20	By	Date
Lathe Section									
A	2.274	2.279		2.279	2.279	2.279	2.279	BC	06.11.05
B	3.702	3.722		3.712	3.712	3.712	3.712		
C	2.564	2.584		2.573	2.573	2.573	2.573		
D	0.718	0.738		.725	.725	.725	.725		
E	0.090	0.110		.100	.100	.100	.100		
F	2.464	2.484		2.473	2.473	2.473	2.473		
G	2.029	2.049		2.039	2.039	2.039	2.039		
H	2.964	2.984		2.973	2.973	2.973	2.973		
I	0.913	0.933		.923	.923	.923	.923		
J	0.022	0.042		.032	.032	.032	.032		
K	0.090	0.110		.097	.097	.097	.097		
L									
HAAS Section									
AA	0.188	0.193	DT8706	0.190	0.190	0.190	0.190		
AB	0.240	0.260		0.250	0.250	0.250	0.250		
AC	0.115	0.150		0.121	0.124	0.123	0.126		
AD	0.040	0.060		0.051	0.051	0.053	0.051		
AE	0.010	0.020		0.015	0.015	0.015	0.015		
AF	0.240	0.260		0.250	0.250	0.250	0.250		
AG	0.290	0.310		0.299	0.299	0.299	0.300		
AH	0.115	0.150		0.141	0.140	0.142	0.141		
AI	0.454	0.474		0.461	0.462	0.461	0.464		
AJ	2.779	2.789		2.784	2.781	2.781	2.783		
AK	0.240	0.260		0.250	0.250	0.250	0.250		
AL	1.002	1.042		1.042	1.042	1.042	1.042		
AM	0.053	0.073		0.063	0.063	0.063	0.063		
AN	0.257	0.262	DT8683	0.258	0.258	0.258	0.258		
AO	1.663	1.683		1.681	1.683	1.682	1.681		
AP	0.053	0.073		0.063	0.063	0.063	0.063		
AQ	0.022	0.042		0.032	0.032	0.032	0.032		
AR									
AS									
Accept/Reject									

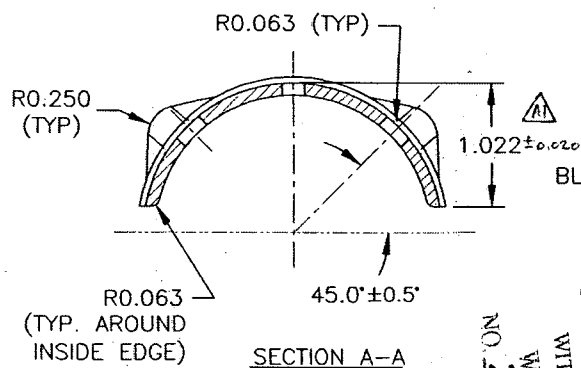
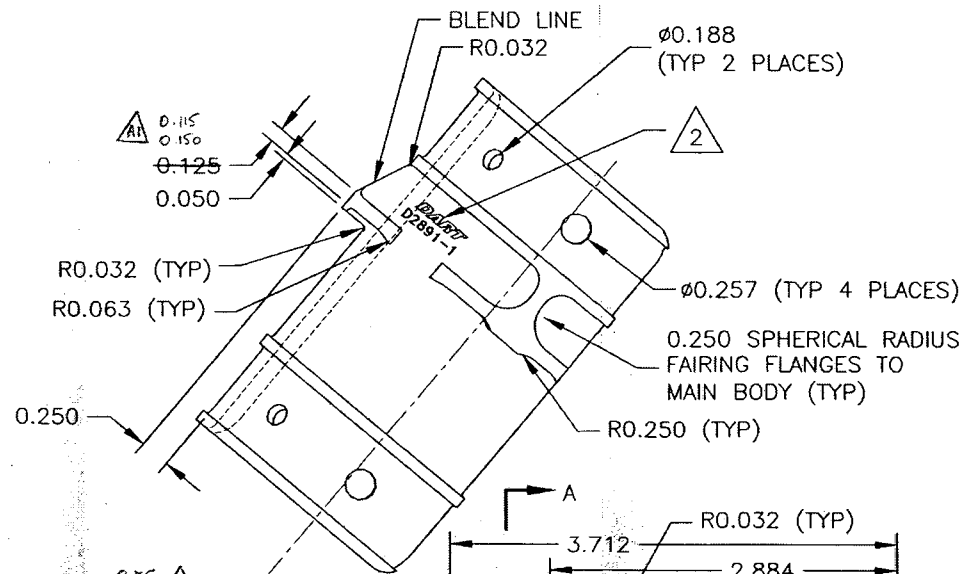
Measured by:	BC / J.G
Date:	06.12.03

Audited by:	SA
Date:	06.12.04

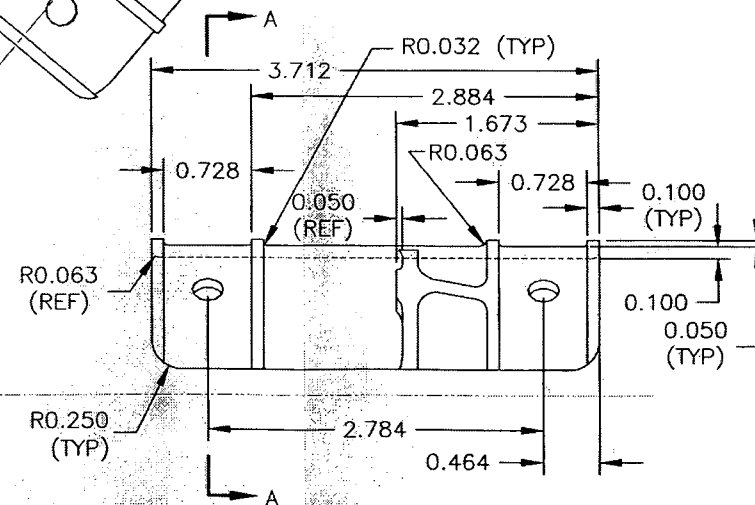
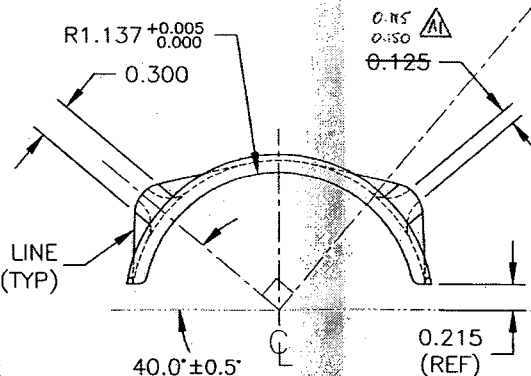
Rev	Date	Change	Revised by	Approved
A	02.12.12	New Issue	KJ/RF	#

D2891-1

- 1) MATERIAL: 17-4 PH STAINLESS STEEL
HEAT TREAT TO H900 CONDITION
(900°F FOR 1 HR, AIR COOL)
MIN UTS = 170 KSI (38 HRC)
- 2) IDENTIFY WITH DART LOGO (PER DART SUPPLIED GRAPHIC) AND PART NUMBER IN THIS AREA WITH 0.125 HIGH LETTERING 0.010-0.020 DEEP.
- 3) BREAK ALL UNMARKED SHARP EDGES 0.010 TO 0.020
- 4) PART IS SYMMETRIC ABOUT CENTERLINE
- 5) TOLERANCES ARE PER DART QSI 018 (REF. X.XXX = ± 0.010) UNLESS OTHERWISE NOTED
- 6) ALL DIMENSIONS ARE IN INCHES
- 7) FINISH: POWDER COAT WHITE (REF. 4.3.5.2) PER DART QSI 005 4.3



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 WITHOUT NOTICE
 WORK ORDER
 NO. 29108



AI	CP	02-01-13	UPDATE DIMS AS MANUFACTURED
A		00.11.17	NEW ISSUE
DESIGN	CP	DRAWN BY	CP
CHECKED	CP	APPROVED	CP
DATE	00.11.17	DRAWING NO.	D2891
		TITLE	Ø2.250 SUPPORT

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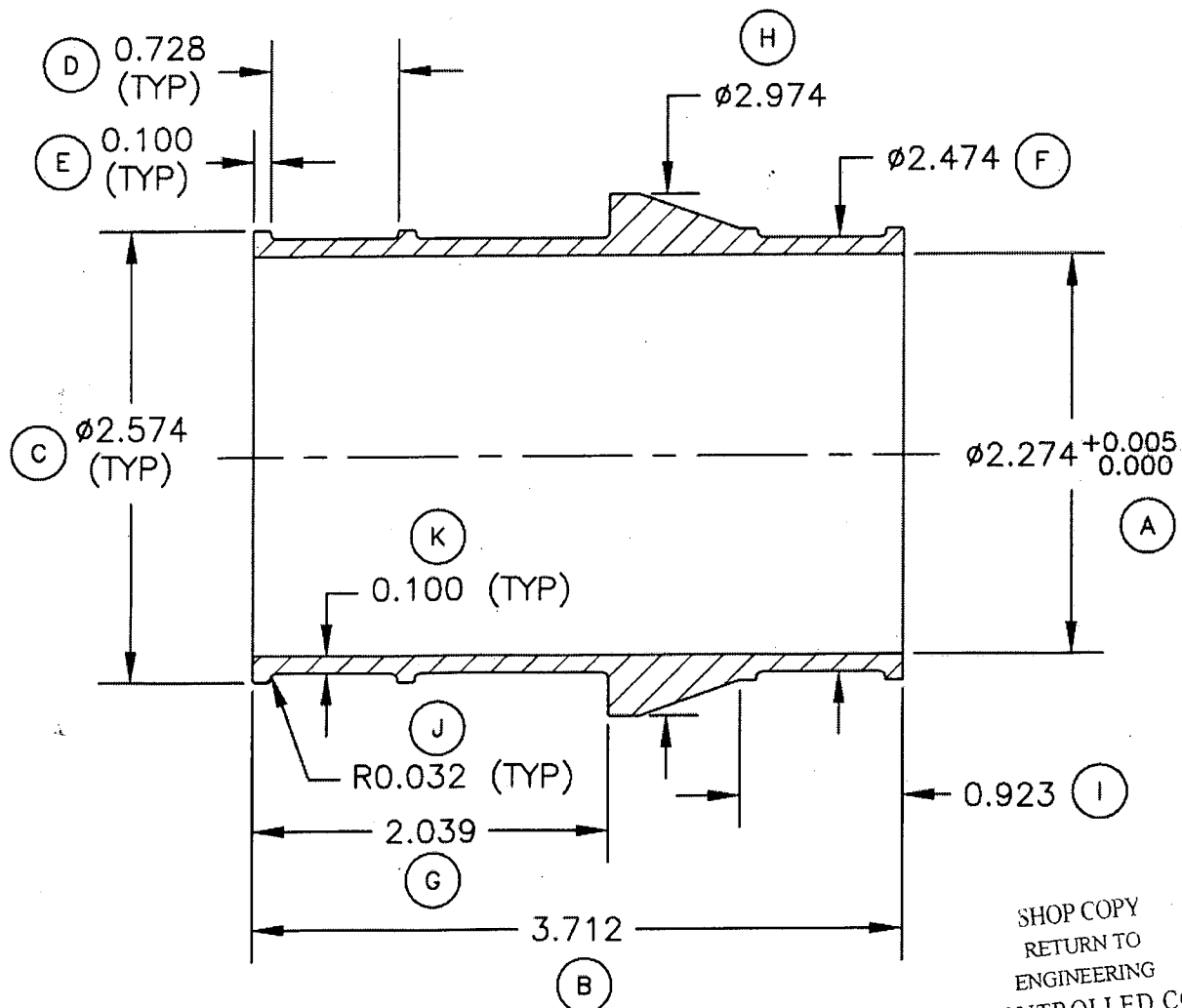
DART AEROSPACE LTD.
 HAMMERSBURY, ONTARIO, CANADA

REV. A
 SHEET 1 OF 1
 SCALE



DESIGN RT	DRAWN BY RT	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
CHECKED CH	APPROVED CH	DRAWING NO. DSK 076	REV. A SHEET 1 OF 1
DATE 03.05.20		TITLE TURNING DETAIL FOR D2891-1	SCALE 1:1
A	03.05.20	NEW ISSUE	

RELEASED
03.07.01



D2891-1 TURNING DETAIL

SHOP COPY
RETURN TO
ENGINEERING
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SUBJECT TO AMENDMENT
WITHOUT NOTICE
WORK ORDER
NO. 29108

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31 544330 295244 30		10/24/06 10/31/06 10/27/06 11/02/06 WP N		544330	
O. REQUISITION CLIENT-CUSTOMER REQUISITION NO.		NO. COM. CLIENT-CUST. ORD. NO.		EXPÉDIÉ PAR SHIP	
PO 00002316		91037 200 40 CABANO (PPD)		EXPÉDIÉ 31 OCT. 2006	
CHÉTEUR-PURCHASING AGENT		TELEPHONE		BILL	
LINDA LACELLE		613 632-3336		NO. FEVILE/EMBALLAGE-B/L NUMBER	
IVRÉ A-SHIP TO:		VENDU A-SOLD TO:		INFORMATION CRÉDIT-CREDIT INFORMATION	
		DART AEROSPACE LTD 1270 ABERDEEN HAWKESBURY ON K6A 1K7		Opéré par / Operated by: TRANSPORT TFI 5 SEC • NIR : R564638-6	
INSTRUCTIONS/LIVRAISON-DELIVERY		INSTRUCTIONS LIVRAISON (CONT.)-DELIVERY (CONT'D.)		ROUTE	
INQ-J43210				30*NL-10/3 31-NL-11/0	
DESCRIPTION - ITEM 1		3.2500 RD 17CR-4NI RT SOL. TREATED COND A 3.80" GOLD		QTE/UNITE COM.-ORDERED	
				20 PCS PCS	
INSTRUCTIONS		INSTRUCTIONS (CONT'D.)		POIDS COM.-WT. ORDERED	
NBR OF OMTRS: MAIL W/MATL 1		DROP LOC: J-1-7 TAG: 210710 TOL + 1/8" - 0 PRIOR DIST/ORD: 30 595244		179	
CASTLE (TORONTO)		COULÉE INFO-HEAT INFO QTE-QTY		BALLOTS-BUNDLES	
		A15389 ✓		PCES/PD EXP. SHP.	
				POIDS EXP.-WT. SHIPPED	
				1 20 179	
				POIDS EST.-GROSS WT.	
				FORME-SHAPE I.A.C.	
				28.210FT	
		INSTRUCTIONS (CONT'D.)		AIRE/CHARGE-LOAD AREA	
		20 x 3.80		ENT-W	
				4	
DESCRIPTION - ITEM 2				QTE/UNITE COM.-ORDERED	
				POIDS COM.-WT. ORDERED	
INSTRUCTIONS		INSTRUCTIONS (CONT'D.)		BALLOTS-BUNDLES	
				PCES/PD EXP. SHP.	
				POIDS EXP.-WT. SHIPPED	
				POIDS EST.-GROSS WT.	
				FORME-SHAPE I.A.C.	
				AIRE/CHARGE-LOAD AREA	
				ENT-W	
				25 x 25 x 16	
Métaux Castle		INSTRUCTIONS (CONT'D.)		QTE/UNITE COM.-ORDERED	
835 Selkirk				POIDS COM.-WT. ORDERED	
aire, Que. H9R 3S2				BALLOTS-BUNDLES	
06644 2				PCES/PD EXP. SHP.	
				POIDS EXP.-WT. SHIPPED	
				POIDS EST.-GROSS WT.	
				FORME-SHAPE I.A.C.	
				AIRE/CHARGE-LOAD AREA	
				ENT-W	
				179 #	
		INSTRUCTIONS (CONT'D.)			

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NE PAS TRAITER END DO NOT PROCESS


 SYRACUSE
NEW YORK 13201

CERTIFICATE OF TEST

A M CASTLE, INC

SHIP TO

A M CASTLE, INC

OUR ORDER NO.

PS-16995-3-01

3400 N WOLF RD

4501 BINGLE STREET

FRANKLIN PARK, IL 60131

HOUSTON, TX 77092

03

DATE

04/30/04

CUSTOMER ORDER # & DATE

21-22445

CUSTOMER REQ. #

DISTRICT

B PARSONS

SHIPPED FROM

SYRACUSE

DESCRIPTION OF MATERIAL

SIZE

CRU 17CR 4NI RTA IAC 42470

3.250 RD

3174-10 REV 4 ASME-SA564-98ED T630 ASTM-A564-02 T630

AMS-5643Q (EX SURFACE) AISI 630 UNS S17400

HEAT NO.

CHEMICAL ANALYSIS

HEAT NO.	C	MN	P	S	SI	NI	CR	MO	CU	CO	TA
A15389	.047	.63	.025	.021	.55	4.16	15.20	.094	3.23	.29	.010

CASTLE METALS HOU

DATE REC'D 5-13-04

REC'D FROM Crucible

IAC 42470 RD 33P43

APPROVED BY [Signature]

QUANTITY

HEAT NO.

MECHANICAL PROPERTIES

QUANTITY	HEAT NO.	TENSILE PSI	YLD. 2% PSI	%ELONG 2IN	RED/AREA%	HARDNESS BHN 348
2021 #	A15389	195,980	172,890	13.6	50.0	BHN 388

CAPABILITY PHYSICALS AFTER 900 DEG. F. - 1 HR. AIRCOOL:

MACRO TEST OK

FERRITE 5 %

MAGNAFLUX F/S = 0/0

REDUCTION RATIO: 27.5:1

ELECTRIC FURNACE ADD MELTED

MATERIAL SOLUTION TREATED AT 1900 DEG. F. HELD 45 MINUTES AT TEMPERATURE -

AIRCOOLED.

CRUCIBLE MATERIALS CORP. VENDOR #18610.

MATERIAL INGOT CAST.

NAFTA - YES

 MATERIAL FREE FROM MERCURY CONTAMINATION AT TIME OF SHIPMENT
 NO WELD REPAIR PERFORMED
 MATERIAL MELTED IN U.S.A.

 THANK YOU FOR SELECTING A QUALITY PRODUCT
 MANUFACTURED BY THE EMPLOYEES OF CRUCIBLE SPECIALTY METALS JU

SWORN TO AND SUBSCRIBED BEFORE ME THIS

DAY OF . 20

NOTARY PUBLIC

JACKIE L WHITE - SPECIFICATION EXAMINER

 THE ABOVE MATERIAL WAS MANUFACTURED AND TESTED IN ACCORDANCE
 WITH ABOVE SPECIFICATIONS AND IS IN CONFORMANCE WITH THOSE
 SPECIFICATION REQUIREMENTS.

 CRUCIBLE MATERIALS CORPORATION
 ACTING BY AND THROUGH ITS SPECIALTY METALS DIVISION

CERTIFIED BY:

QUALITY ASSURANCE REPRESENTATIVE

CERTIFICATE OF TEST

A M CASTLE, INC
3400 N WOLF RD
FRANKLIN PARK, IL 60131

SHIP TO
A M CASTLE, INC
4501 BINGLE STREET
HOUSTON, TX 77092

OUR ORDER
PS-16995-1
DATE
03 04/30/04

CUSTOMER ORDER # & DATE 21-22445	CUSTOMER REQ. #	DISTRICT B PARSONS	SHIPPED FROM SYRACUSE
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DESCRIPTION OF MATERIAL

CRU 17CR 4NI RTA IAC 42470
3174-10 REV 4 ASME-SA564-98ED T630 ASTM-A564-02 T630
AMS-5643Q (EX SURFACE) AISI 630 UNS S17400

SIZE

3.250 RD

HEAT NO.

CHEMICAL ANALYSIS

HEAT NO.	C	MN	P	S	SI	NI	CR	MO	CU	CB	TA
A15389	.047	.63	.025	.021	.55	4.16	15.20	.094	3.23	.29	.010

CASTLE METALS HQ

DATE REC'D 5-13-04
REC'D FROM Crucible
IAC 42470 RD 33843
APPROVED BY [Signature]

QUANTITY

HEAT NO.

MECHANICAL PROPERTIES

2021 # A15389 TENSILE PSI YLD.2XPSI XELONG2IN RED/AREA% HARDNESS
CAPABILITY PHYSICALS AFTER 900 DEG. F. - 1 HR. AIRCOOL:
195,980 172,890 13.6 50.0 BHN 388

MACRO TEST OK
FERRITE 5 %
MAGNAFLUX F/S = 0/0
REDUCTION RATIO: 27.5:1
ELECTRIC FURNACE AOD MELTED
MATERIAL SOLUTION TREATED AT 1900 DEG. F. HELD 45 MINUTES AT TEMPERATURE -
AIRCOOLED.
CRUCIBLE MATERIALS CORP. VENDOR #18610.
MATERIAL INGOT CAST.
NAFTA - YES

MATERIAL FREE FROM MERCURY CONTAMINATION AT TIME OF SHIPMENT
NO WELD REPAIR PERFORMED
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QUALITY ASSURANCE REPRESENTATIVE